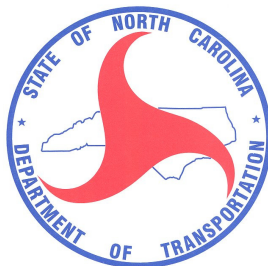


ANNUAL REPORT FOR 2008



Jeffreys Warehouse Wetland Mitigation Site
Wayne County
TIP No. R-1030AA



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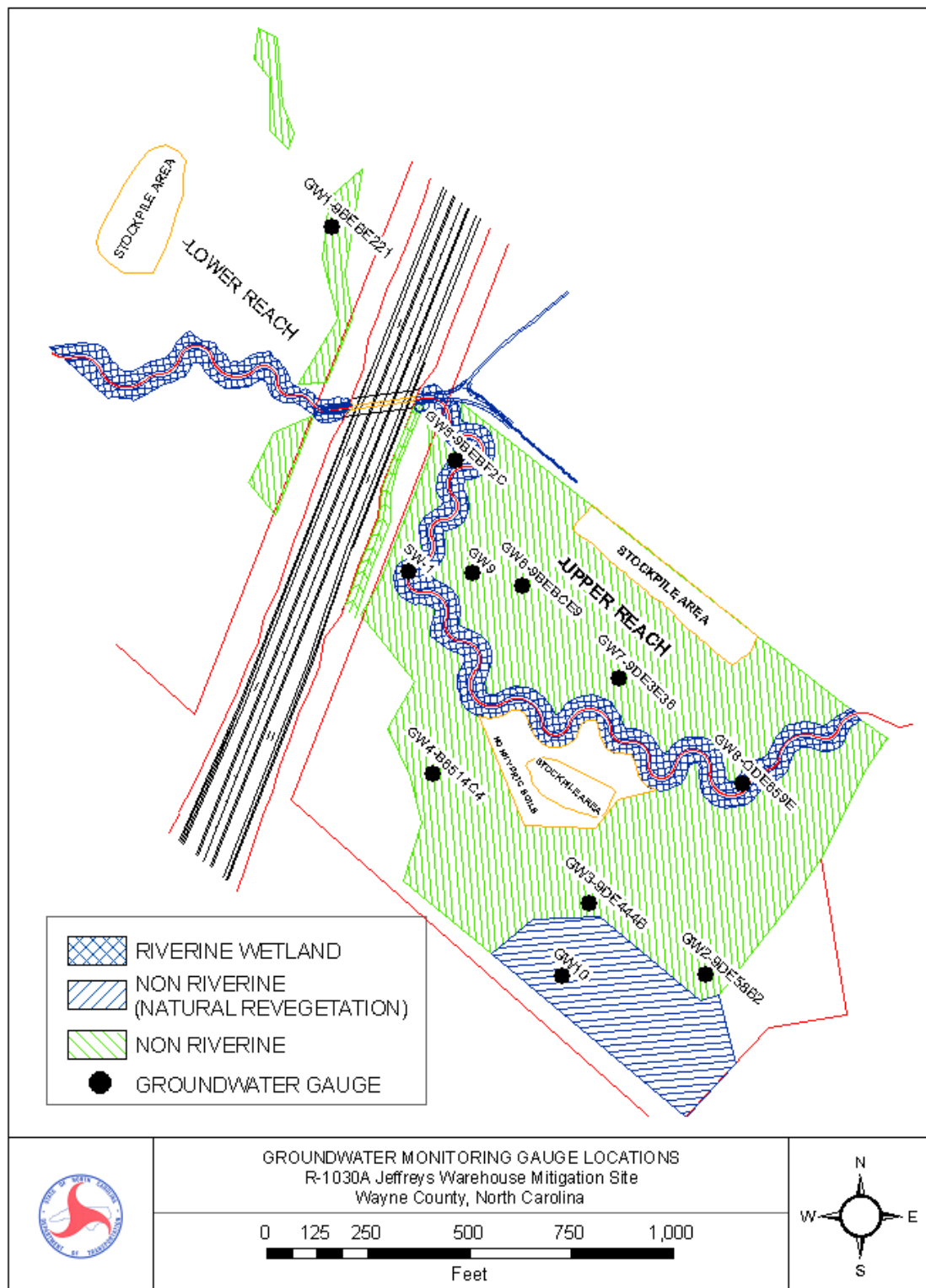
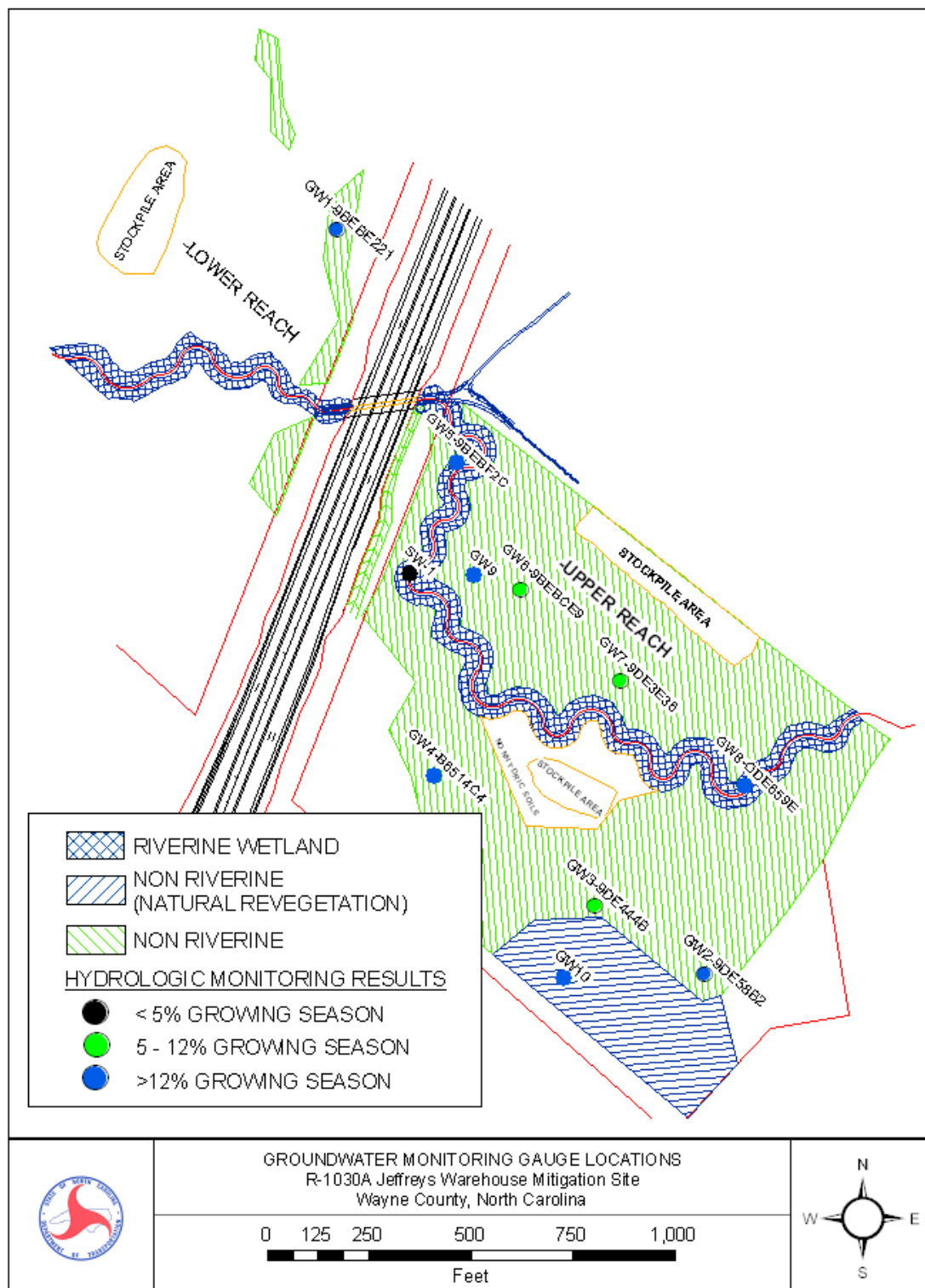


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APPENDICES

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SUMMARY

The following report summarizes the wetland monitoring activities conducted during 2008 at the Jeffreys Warehouse Mitigation Site. The site, situated on US 117 in Goldsboro, was designed and constructed during 2006 by the North Carolina Department of Transportation (NCDOT) in order to provide mitigation for wetland impacts associated with the construction of Transportation Improvement Program (TIP) number R-1030AA. This report provides the monitoring results for the second formal year of monitoring (Year 2008). The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful.

Site hydrology is monitored with ten groundwater gauges and one surface water gauge. Groundwater gauges nine and ten were installed at the end of the first growing season and were not included for the first formal year of monitoring. Seven of the ten groundwater gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season) in 2008. A surface water gauge was installed at the end of 2007 to record stream flow. Based on the streams design parameters, the data indicated that six bankfull events occurred during the 2008 monitoring period.

Eight vegetation plots were established to monitor the trees planted in the 26.3 acre site. NCDOT replanted the site in March 2007 due to low survival counts from the 2006 planting. The 2008 vegetation monitoring revealed an average density of 629 trees per acre, which is well above the minimum success criteria of 320 trees per acre. The area around plots 6 and 7 were supplementally planted in January 2008 to increase plant survivability. Vegetation Plot 6 was failing during the 2007 monitoring evaluation. The at-planting numbers for vegetation plot 6 and 7 reflect this supplemental planting that took place in January 2008.

NCDOT will continue hydrologic and vegetation monitoring at the Jeffreys Warehouse Mitigation Site in 2009.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the wetland monitoring activities that have occurred during 2008 at the Jeffreys Warehouse Mitigation Site. The site is located adjacent to US 117 in Goldsboro (Figure 1). The site was constructed to provide mitigation for wetland impacts associated with (TIP) number R-1030AA in Wayne County. The 87.7 acre site provides 3.66 acres of riverine wetland restoration, 23.02 acres of non-riverine wetland restoration, and 12.36 acres of non-riverine wetland preservation. The site also provides 7.26 acres of Neuse Buffer restoration.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until success criteria are satisfied. Success criteria are based on federal guidelines for wetland mitigation. Criteria for hydrologic conditions and vegetation survival are included in these documents. The following report describes the results of the hydrologic and vegetation monitoring during the 2008-growing season at the Jeffreys Warehouse Mitigation Site.

1.3 Project History

March/April 2006	Site Planted and Live Staked
March 2007	Site Replanted
March-November 2007	Hydrologic Monitoring (Year 1)
August 2007	Vegetation Monitoring (Year 1)
January 2008	Supplemental Planting
March-November 2008	Hydrologic Monitoring (Year 2)
June 2008	Vegetation Monitoring (Year 2)

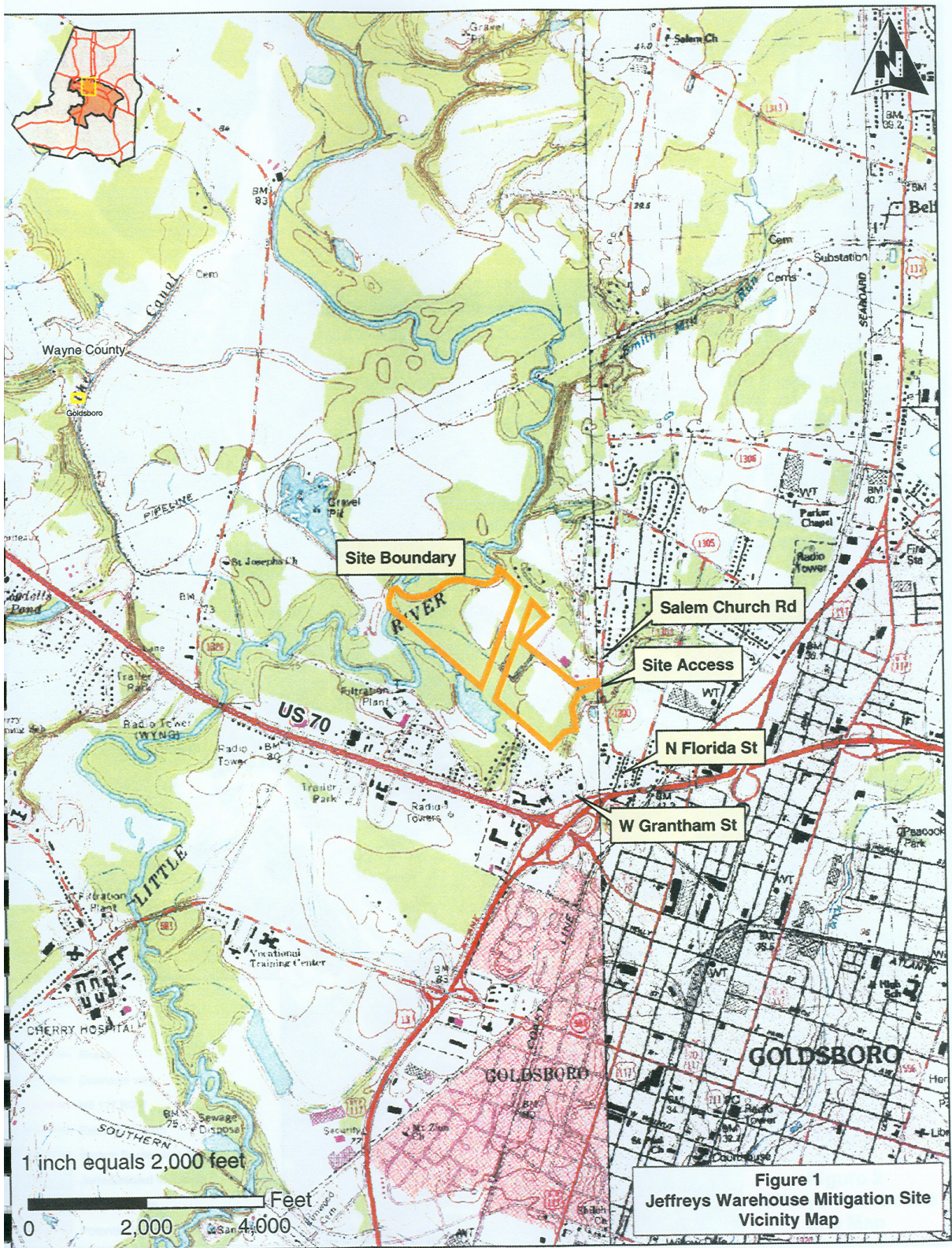


Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

In accordance with the mitigation plan and permit for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12 inches of the surface) by surface or groundwater for at least a consecutive 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% and 12.5% of the growing season can be classified as wetlands depending upon factors such as the presence of hydrophytic vegetation and hydric soils.

The growing season in Wayne County begins on March 17 and ends November 14. These dates correspond to a 50% probability that temperatures will not drop to 28⁰ F or lower after March 17 and before November 14. The growing season is 243 days; therefore hydrology for 12.5% of the growing season is at least 30 consecutive days, while 8.0% would be equivalent to 18 days. Local climate must represent average conditions for the area in order for the hydrologic data to be valid.

2.2 Hydrologic Description

Ten groundwater monitoring gauges and one surface water monitoring gauge are used to record site hydrologic data. Gauges nine and ten and the surface water gauge were not installed until the end of the 2007 growing season and were not monitored until the 2008 monitoring year. The groundwater gauges are set to record daily water levels, while the surface water gauge is set to record at 3-hour intervals. The hydrologic response (groundwater) to rainfall events is evaluated using data provided by the North Carolina State Climate Office.

Appendix A contains a plot of the water depth for each of the groundwater and surface water monitoring gauges for 2008. Precipitation events, provided by State Climate Office, are included on each groundwater graph as bars.

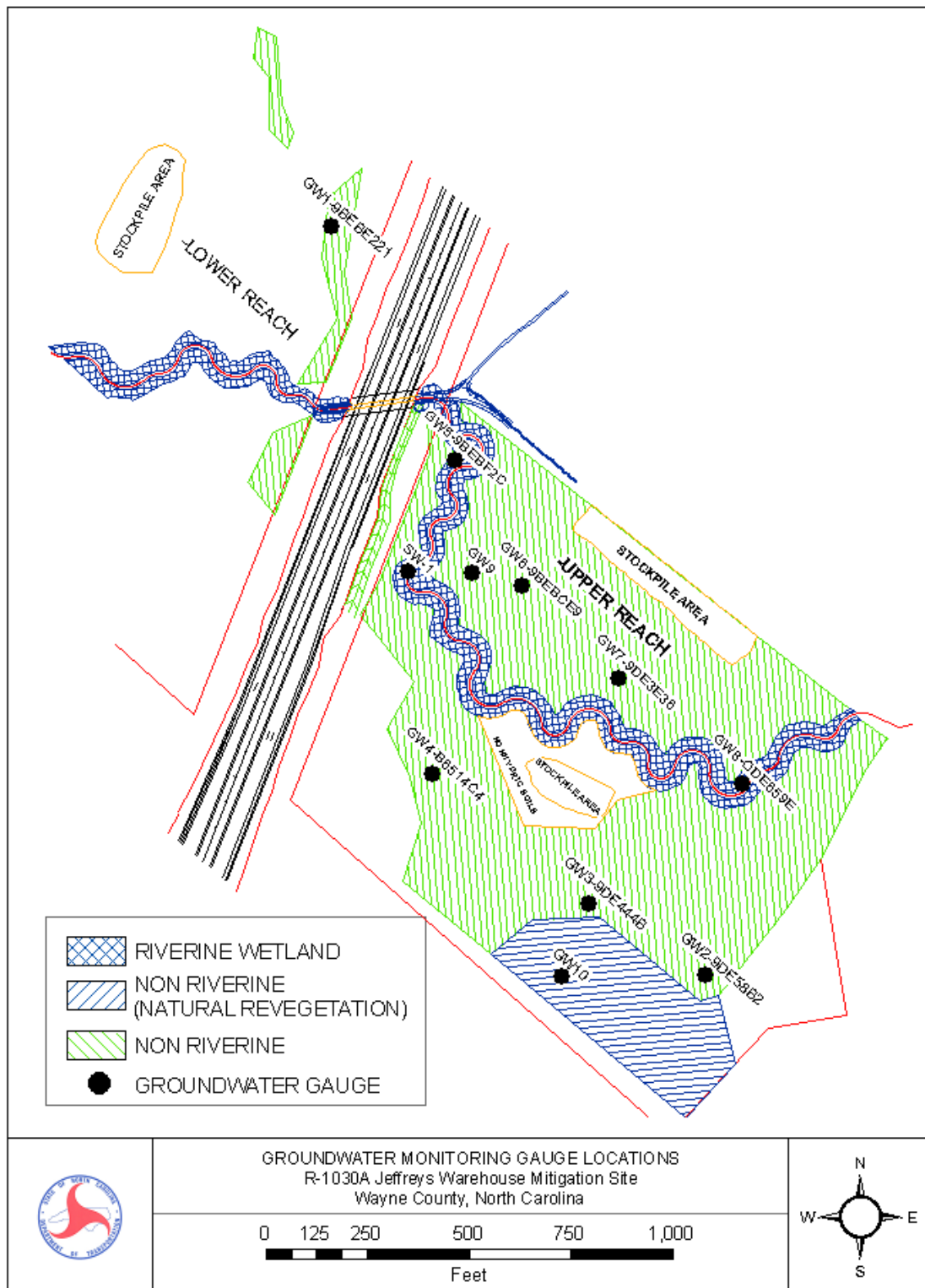


Figure 2. Monitoring Gauge Location Map

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The total number of consecutive days that the groundwater was within twelve inches of the surface was determined for each groundwater-monitoring gauge. This number was converted into a percentage of the growing season. Table 1 presents the hydrologic results for 2008. Figure 3 is a graphical representation of the hydrologic monitoring results for 2008.

Table 1. 2008 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-12.5%	>12.5%	Actual %	Dates of Success
JWGW-1			×	21.0	August 27 - October 16
JWGW-2			×	28.0	March 17 - May 22
JWGW-3		×		6.6	
JWGW-4			×	35.4	August 27 - November 24
JWGW-5			×	54.3	March 17 – July 3 July 6 - November 24
JWGW-6		×		6.2	
JWGW-7		×		6.6	
JWGW-8			×	54.3	March 17 – July 3 July 6 - November 24
JWGW-9			×	17.3	August 27 - October 7
JWGW-10			×	28.4	March 17 - May 23 August 27 – October 13

2.3.2 Climatic Data

Figure 4 is a comparison of monthly rainfall for the period of January through November 2008 to historical precipitation (collected between 1975 and 2008) for Goldsboro, North Carolina. This comparison gives an indication of how 2008 relates to historical data in terms of climate conditions. The NC State Climate Office provided all of the local rainfall information.

For the 2008-year, the months of February, April and September experienced above average rainfall. The months of March, May, August, October and November recorded average rainfall for the site. The months of January, June and July experienced below average rainfall. Overall, 2008 experienced an average rainfall year.

2.4 Conclusions

The 2008-year represents the second full growing season that hydrologic data has been collected on the Jeffreys Warehouse Mitigation Site. Seven of the ten groundwater-monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season), while three groundwater gauges met between 5% and 12.5% of the growing season. NCDOT will continue to monitor the hydrology at the Jeffrey's Warehouse Mitigation Site in 2009.

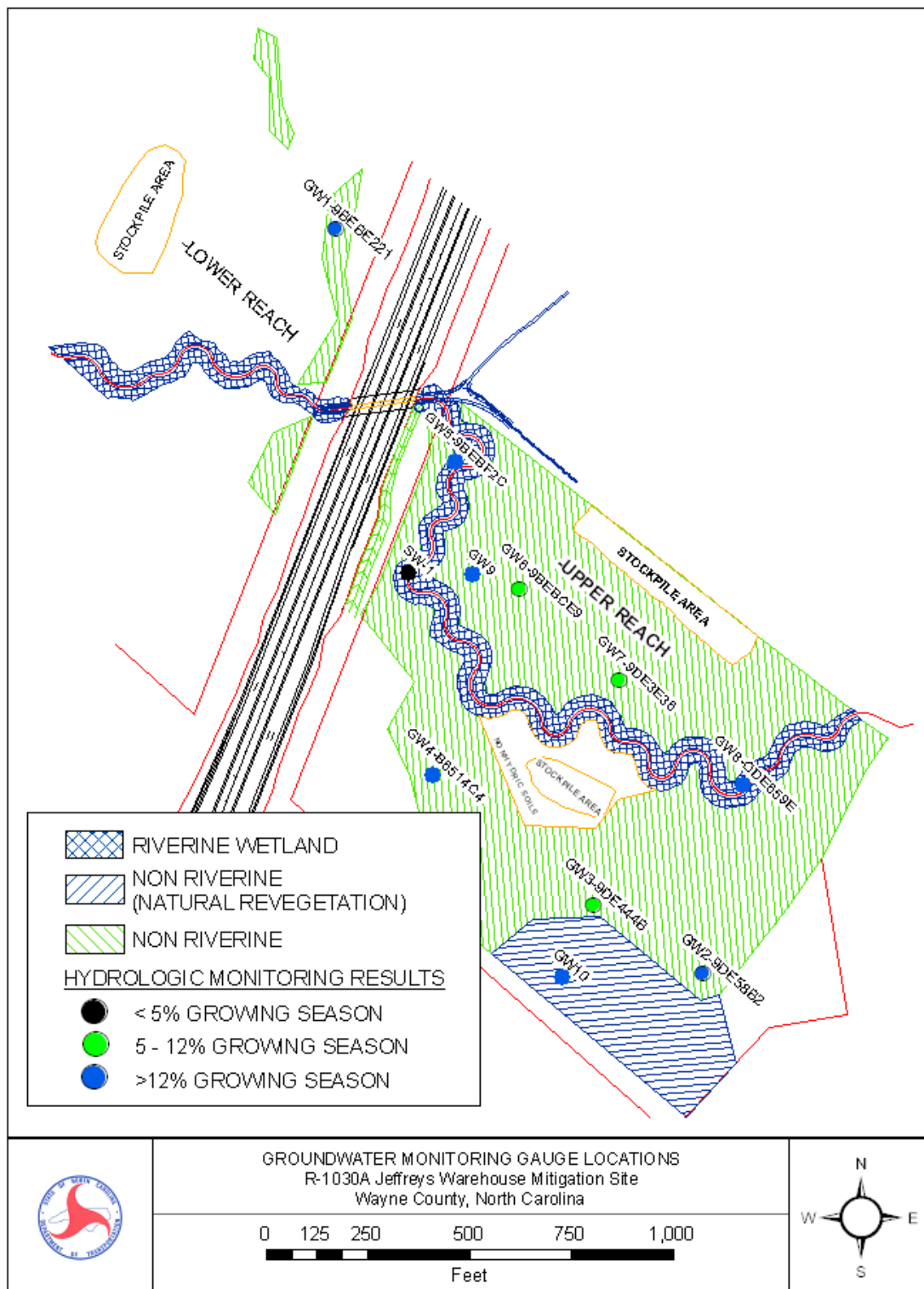
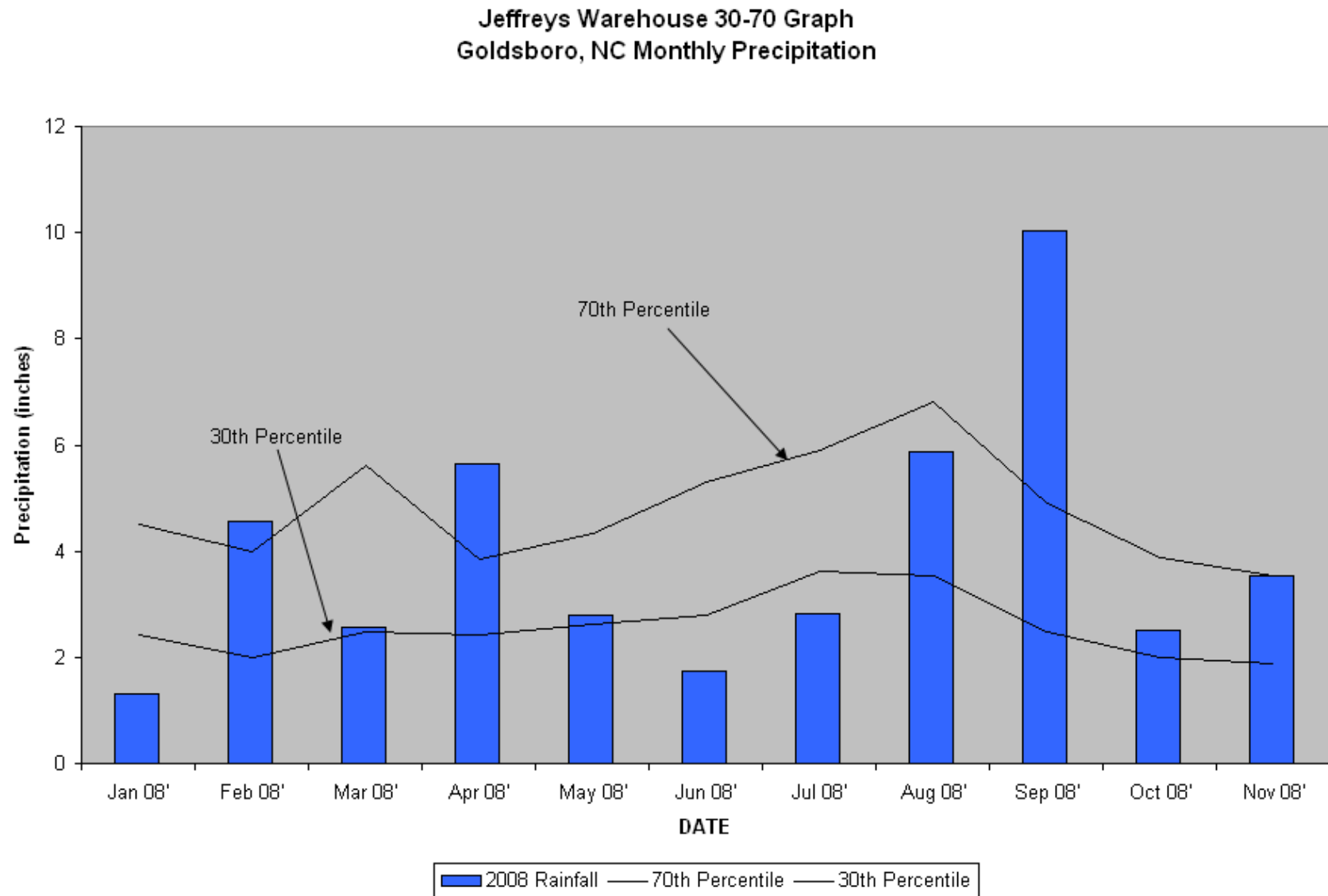


Figure 3. 2008 Hydrologic Monitoring Results Map

Figure 4. 30-70 Percentile Graph



3.0 VEGETATION: JEFFREYS WAREHOUSE MITIGATION SITE (YEAR 2 MONITORING)

3.1 Success Criteria

Success Criteria states that there must be a minimum of 320 trees per acre living for at least three consecutive years. A minimum of 290 trees per acre must be living at year 4, and a minimum of 260 trees per acre must be living at year 5.

3.2 Description of Species

The following live stakes were planted on the streambanks:

Black Willow, *Salix nigra*

Silky Dogwood, *Cornus amomum*

The following tree species were planted in the Riverine - Bankfull Bench Area:

Laurel Oak, *Quercus laurifolia*

Overcup Oak, *Quercus lyrata*

Willow Oak, *Quercus phellos*

Water Oak, *Quercus nigra*

Swamp Chestnut Oak, *Quercus michauxii*

River Birch, *Betula nigra*

The following tree species were planted in the Non-Riverine - Wetland Area:

Laurel Oak, *Quercus laurifolia*

Willow Oak, *Quercus phellos*

Swamp Chestnut Oak, *Quercus michauxii*

Cherrybark Oak, *Quercus falcata* var. *pagodaefolia*

Water Tupelo, *Nyssa aquatica*

3.3 Results of Vegetation Monitoring

Table 2. Vegetation Monitoring Statistics

Plot #	Laurel Oak	Overcup Oak	Willow Oak	Water Oak	Swamp Chestnut Oak	River Birch	Cherrybark Oak	Water Tupelo	Total (1 Year)	Total (at planting)	Density (Tree/Acre)
1	10	3	4	3	5	10			35	37	643
2	2		8		17		13	4	44	47	637
3	3		3		19		8		33	40	561
4	11		6				27		44	45	665
5	13	1	7	2		10			33	33	680
6			3		2		21	4	30	42	486
7	8		7		10		12	2	39	39	680
8	1	15	4	3	4	7			34	34	680
Average Tree Density									629		

Site Notes: Other species noted: lespedeza, cattail, black willow, silky dogwood, ragweed, fennel, woolgrass, *Juncus* sp., sweetgum, goldenrod, wax myrtle, multi-flora rose, *Scirpus* sp., red maple, tear thumb, briars, alder, *Baccharis* sp., and various grasses. River birch was also noted volunteering in the Non-Riverine Wetland.

3.4 Conclusions

Approximately 26.3 acres of this site was planted in March and April 2006. NCDOT replanted the site in March 2007 due to low survival counts from the 2006 planting. There were 8 vegetation monitoring plots established throughout the Riverine and Non-Riverine areas. The 2008 vegetation monitoring revealed an average density of 629 trees per acre, which is well above the minimum success criteria of 320 trees per acre. The area around plots 6 and 7 were supplementally planted in January 2008 to increase plant survivability. Vegetation Plot 6 was failing during the 2007 monitoring evaluation. The at-planting numbers for vegetation plot 6 and 7 reflect this supplemental planting that took place in January 2008.

NCDOT will continue vegetation monitoring at the Jeffreys Warehouse Mitigation Site for 2009.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2008-year represents the second full growing season that hydrologic data has been collected on the Jeffreys Warehouse Mitigation Site. Seven of the ten groundwater-monitoring gauges met the jurisdictional criteria for wetland hydrology (>12.5% of the growing season), while three groundwater gauges met between 5% and 12.5% of the growing season.

There were 8 vegetation monitoring plots established throughout the Riverine and Non-Riverine areas. The 2008 vegetation monitoring revealed an average density of 629 trees per acre, which is well above the minimum success criteria of 320 trees per acre. The area around plots 6 and 7 were supplementally planted in January 2008 to increase plant survivability.

NCDOT will continue hydrologic and vegetation monitoring at the Jeffreys Warehouse Mitigation Site in 2009.

APPENDIX A

GROUNDWATER GAUGES AND SURFACE WATER GAUGE

APPENDIX B
SITE PHOTOS AND PHOTO AND PLOT LOCATIONS
MAP

Jeffreys Warehouse



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

June 2008

Jeffreys Warehouse



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12

June 2008

Jeffreys Warehouse



Photo 13

